PROTECTIVE PACKAGE FOR AN OPTICAL FIBER SPLICE

This invention relates to a protective package for an optical fiber splice. In particular it relates to a self-contained package which is readily applied, w' h little or no preparation at the time of application.

The splicing of optical fiber pairs in end-to-end axial alignment by fusion, enclosing in a sleeve and other techniques is now widely accepted. However the splice should be protected by a suitable packaging which will provide structural and environmental protection during handling and service.

It has been proposed to cover the splice by a heat shrink tube, but the tube must be positioned over one fiber prior to splicing, a heat source of correct characteristics is necessary and the tube is very flexible.

The present invention provides a protective package which provides structural rigidity, seals the bare fiber from external influences and is self-contained, using a pressure sensitive adhesive.

Broadly, the protective package comprises two elongate plastic material members and a layer of pressure sensitive adhesive on front faces of the plastic members, whereby on laying a fiber splice on one member, on the adhesive material, the other member is applied, front face to front face, and the members adhere to each other around the splice. The members can be hingedly joined side by side by the layer of adhesive material, or a hinge can be provided. Locking means on one or both members can be provided. Several pairs of spliced fibers can be positioned side by side in one pair of members. Grooves are provided at each end of each member to accept a coated portion of each fiber. If desired a narrow groove can be provided at the center portion of each member to accept the uncoated spliced ends of the fibers.

The invention will be readily understood by the following description of certain embodiments by way of example, in conjunction with the accompanying drawings, in which:

FIG. **1** is a perpective view of one form of package with an optical fiber splice in position;

FIG. **2** is an end view of a package as illustrated in FIG. **1**, the members hinged together by the adhesive layer;

FIG. **3** is a cross-section on the line III—III of FIG. **1**;

FIG. **4** is a cross-section as in FIG. **3**, with the package in a closed condition;

FIG. **5** is a cross-section similar to that of FIG. **3** illustrating a package with the members connected by a plastic hinge;

FIG. **6** is a cross-section, similar to that of FIG. **3**, of a package with the members connected by a plastic hinge, and with locking means;

FIG. **7** is a transverse cross-section of the package of FIG. **6** in a closed condition;

FIG. **8** is a transverse cross-section of a multiple splice package;

FIG. **9** is a transverse cross-section of a package using two separate members, interlocking;

FIG. **10** is a cross-section similar to FIG. **3** and illustrates a modified form of the package illustrated in FIGS. **1**, **2** and **3**;

FIG. **11** is a cross-section, as in FIG. **10**, with the package closed about a pair of spliced fibers.

FIGS. **1** and **2** illustrate the general concept of a package in accordance with the invention. The package, indicated generally at **10**, comprises two plastic members **11** and **12**, elongate in plan form. Each member has a longitudinal groove **14** at each end. Covering the two members, on their front faces, is a layer of pressure sensitive adhesive **15**. On one member **11**, is positioned a spliced pair of fibers **16** and **17**. The fiber ends are bare, on either side of the splice, the coated portions of the fibers positioned over the grooves **14**. The grooves **14** may be of such dimensions as to be a fairly firm fit on the coated fibers, over the layer of adhesive, although the grooves can be larger. The grooves **14** preferably are such as will ensure a seal around the coated fibers. Prior to positioning the spliced fibers **16** and **17** on one of the members **11**, **12**, a protective cover or backing is removed from the adhesive layer **15** to expose the adhesive. After positioning the spliced fibers on one of the members, the two members are pressed together, face to face, the adhesive layer bonding the two members together.

FIG. **2** illustrates one embodiment as in FIG. **1**, illustrating the two members **11** and **12**, adhesive layer **15** and protective cover or backing **18**. The two members are connected together by the adhesive layer **15** and the cover **18**. FIG. **3** illustrates the use of the package of FIG. **2**. The protective cover **18** has been removed, exposing the pressure sensititve adhesive layer **15**. A spliced pair of fibers is placed on the layer **15**, the coated portions of the fibers over the grooves **14** in one member **12** in FIG. **3**. Member **11** is then pivotted over, as indicated by the arrow **20**. The final package is illustrated in FIG. **4**.

In the embodiment as illustrated in FIG. **1**, and in FIGS. **2**, **3**, and **4**, the connection of the two members **11** and **12** is by the adhesive layer **15**. A suitable adhesive is a modified acrylic adhesive such as is sold by National Starch under the name "Tackmaster". A typical thickness for the adhesive layer is about 0.005". Other adhesives can be used, and the thickness can vary. The package is prepared by positioning two members side-by-side and the pressure adhesive layer **15** and backing or cover **18** is applied to the front faces of the members. This holds the members together. As described, the protective backing or cover **18** is removed prior to positioning of the spliced fibers. The adhesive layers are compressed by the bare ends of the fibers **16** and **17**, which are closely held in the center sections of the members **11** and **12**, while the coated portions are more loosely held in the grooves at the end sections.

The package is extremely easy to use. The previously assembled members can be supplied ready to use and all the user has to do after the fibers have been spliced is to remove the protective cover or backing and, in effect, fold the package about the splice, pressing the two members firmly together for a completed packaging.

An alternative embodiment is illustrated in FIG. **5**. In this embodiment, two plastic members **30** and **31** are connected by a hinge formed by a thin section **32**. The protective cover or backing is not shown in FIG. **9**, spliced fibers being in position prior to closing the two members together. The layer of pressure sensititve adhesive **33** need not, in this example be such that it has enough strength to hold the two members together and act as a hinge. FIG. **6** illustrates an embodiment in which two members **35** and **36** are connected by a thin portion **37** which acts as a hinge, and one of the members **35**, has a hooked member **38** extending upward